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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,327	03/24/2004	Takashi Ando	042271	4003
38834	7590	07/06/2006	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			LEWIS, MONICA	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 07/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/807,327	<b>Applicant(s)</b> ANDO, TAKASHI	
	<b>Examiner</b> Monica Lewis	<b>Art Unit</b> 2822	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2,4,6,8,10,12,13,15,16 and 18-30 is/are pending in the application.  
     4a) Of the above claim(s) 13,15,16 and 18-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2,4,6,8,10 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/06</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Marked Up-Figure 10</u> .              |

### **DETAILED ACTION**

1. This office action is in response to the amendment filed April 11, 2006.

#### ***Drawings***

2. The drawings are objected to because the Applicant removed all of the reference numbers (See Figures 10-12). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

#### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claim 2, 4, 6, 8, 10 and 12 recites the following limitations: a) said transistor (See Claims 2, 4, 10 and 12); b) the line connecting the source and the drain of one (See Claims 6 and 8); c) the line connecting the source and drain of the other one (See Claims 6 and 8); and d) the other one of the source or the drain (See Claims 10 and 12). There is insufficient antecedent basis for these limitations in the claim.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claim 2 is rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's Prior Art.

In regards to claim 2, Applicant's Prior Art discloses the following:

a) a semiconductor substrate (51) (For Example: See Figure 11);

b) a plurality of transistors formed on a surface of said semiconductor substrate (For Example: See Figure 11);

c) an interlayer insulating film (58) for covering said transistors (For Example: See Figure 11);

d) a plurality of ferroelectric capacitors (65) formed over said interlayer insulating film, an electrode of each of said plurality of ferroelectric capacitors being connected to one of a source or a drain (56) of said transistor via a first contact plug (59), wherein said plurality of ferroelectric capacitors are arranged in an array extending in longitudinal and lateral directions, (For Example: See Figure 11);

e) a plurality of bit lines (61) formed over said interlayer insulating film, each of said plurality of bit lines being connected to the other one of the source or the drain of said transistor via a second contact plug (60) (For Example: See Figure 11); and

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f) the second contact plug is substantially located in a center area surrounded by four closest ferroelectric capacitors out of said plurality of ferroelectric capacitors (For Example: See Figure 10).

**Note: Applicant submitted replacement drawings for figures 10-12 that removed all the reference numbers listed above. The Examiner has kept the reference numbers that corresponded to the drawings filed on 3/24/04 in the office action for examination purposes only.**

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art.

In regards to claim 4, Applicant's Prior Art fails to disclose the following:

a) a straight line connecting the source and the drain of said transistor extends in a direction substantially inclined at an angle of 45 degrees to longitudinal and lateral directions of the arrays constituted by the plurality of ferroelectric capacitors.

However, the applicant has not established the critical nature of "a straight line connecting the source and the drain of said transistor extends in a direction substantially inclined at an angle of 45 degrees to longitudinal and lateral directions of the arrays constituted by the plurality of ferroelectric capacitors." "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). Therefore, it would

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have been obvious to one having ordinary skill in the art at the time the invention was made to have various ranges.

9. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art in view of Summerfelt et al. (U.S. Publication No. 2005/0012125).

In regards to claim 6, Applicant's Prior Art fails to disclose the following:

a) an element isolation insulating film formed on the surface of said semiconductor device and isolating a plurality of element regions, wherein each element region includes two transistors out of said plurality of transistors, and wherein the line connecting the source and the drain of one of said two transistors substantially coincides with the line connecting the source and the drain of the other one of said two transistor.

However, Summerfelt discloses a semiconductor device that has an element isolation insulating film (8) formed on the surface of said semiconductor device and isolating a plurality of element regions, wherein each element region includes two transistors out of said plurality of transistors, and wherein the line connecting the source and the drain of one of said two transistors substantially coincides with the line connecting the source and the drain of the other one of said two transistor (For Example: See Figure 1A). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Applicant's Prior Art to include a semiconductor device that has an element isolation insulating film formed on the surface of said semiconductor device and isolating a plurality of element regions, wherein each element region includes two transistors out of said plurality of transistors, and wherein the line connecting the source and the drain of one of said two transistors is substantially coincides with the line connecting the source and the drain of the other one of said two transistor as disclosed in Summerfelt because it aids in separating the transistors source/drains (For Example: See Paragraph 29).

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Additionally, since Applicant's Prior Art and Summerfelt are both from the same field of endeavor, the purpose disclosed by Summerfelt would have been recognized in the pertinent art of Applicant's Prior Art.

In regards to claim 10, Applicant's Prior Art fails to disclose the following:

a) the other one of the source or the drain of said transistor is shared by said two transistors in each element region.

However, Summerfelt discloses a semiconductor device that has the other one of the source or the drain of said transistor is shared by said two transistors in each element region (For Example: See Figure 1A). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Applicant's Prior Art to include a semiconductor device that has the other one of the source or the drain of said transistor is shared by said two transistors in each element region as disclosed in Summerfelt because it aids in reducing the capacitance (For Example: See Paragraphs 7 and 8).

Additionally, since Applicant's Prior Art and Summerfelt are both from the same field of endeavor, the purpose disclosed by Summerfelt would have been recognized in the pertinent art of Applicant's Prior Art.

10. Claims 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art in view of Summerfelt et al. (U.S. Publication No. 2005/0012125) and Corvasce et al. (U.S. Patent No. 6,656,801).

In regards to claim 8, Applicant's Prior Art fails to disclose the following:

a) an element isolation insulating film formed on the surface of said semiconductor device and isolating a plurality of element regions, wherein each element region includes two transistors out of said plurality of transistors.

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However, Summerfelt discloses a semiconductor device that has an element isolation insulating film (8) formed on the surface of said semiconductor device and isolating a plurality of element regions, wherein each element region includes two transistors out of said plurality of transistors (For Example: See Figure 1A). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Applicant's Prior Art to include a semiconductor device that has an element isolation insulating film formed on the surface of said semiconductor device and isolating a plurality of element regions, wherein each element region includes two transistors out of said plurality of transistors as disclosed in Summerfelt because it aids in separating the transistors source/drains (For Example: See Paragraph 29).

Additionally, since Applicant's Prior Art and Summerfelt are both from the same field of endeavor, the purpose disclosed by Summerfelt would have been recognized in the pertinent art of Applicant's Prior Art.

b) the line connecting the source and the drain of one of said two transistor is substantially orthogonal to the line connecting the source and the drain of the other one of said two transistor.

However, Corvasce discloses a semiconductor device that has the line connecting the source and the drain of one of said two transistor is substantially orthogonal to the line connecting the source and the drain of the other one of said two transistor (For Example: See Figure 4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Applicant's Prior Art to include a semiconductor device that has the line connecting the source and the drain of one of said two transistor is substantially orthogonal to the line connecting the source and the drain of the other



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one of said two transistor as disclosed in Corvasce because it aids in providing minimal cell size (For Example: See Abstract).

Additionally, since Applicant's Prior Art and Corvasce are both from the same field of endeavor, the purpose disclosed by Corvasce would have been recognized in the pertinent art of Applicant's Prior Art.

In regards to claim 12, Applicant's Prior Art fails to disclose the following:

a) the other one of the source or the drain of said transistor is shared by said two transistors in each element region.

However, Summerfelt discloses a semiconductor device that has the other one of the source or the drain of said transistor is shared by said two transistors in each element region (For Example: See Figure 1A). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor of Applicant's Prior Art to include a semiconductor device that has the other one of the source or the drain of said transistor is shared by said two transistors in each element region as disclosed in Summerfelt because it aids in reducing the capacitance (For Example: See Paragraphs 7 and 8).

Additionally, since Applicant's Prior Art and Summerfelt are both from the same field of endeavor, the purpose disclosed by Summerfelt would have been recognized in the pertinent art of Applicant's Prior Art.

### ***Response to Arguments***

11. Applicant's arguments filed 4/11/06 have been fully considered but they are not persuasive. Applicant argues that Applicant's Prior Art discloses that "the second plug is located in the middle between two closest ferroelectric capacitors, but not substantially located in a center of an area surrounded by four closest ferroelectric capacitors out of said plurality of

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ferroelectric capacitors.” However, Applicant’s Prior Art discloses that the second contact plug (60) is substantially located in a center area surrounded by four closest ferroelectric capacitors (65) out of said plurality of ferroelectric capacitors (For Example: See Figure 10-Marked Up Copy).

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular and after final communications.

ML

June 27, 2006

A handwritten signature in dark ink, consisting of stylized, overlapping loops and a long horizontal stroke extending to the right.

FIG. 10 Prior Art

